

What is claimed is:

1. A work chucking/inserting apparatus to be used for chucking a work and inserting the work into an insertion hole in alignment with the hole, including:

three or more chuck fingers,

said chuck fingers being arranged in circumferentially spaced positions and capable of advancing and retreating radially,

inner surfaces of said chuck fingers serving as chuck surfaces for chucking said work, and

outer surfaces of said chuck fingers being tapered at least at tip end portions thereof so that the closer to the tips, the more inwards the taper, and capable of coming into contact with an inlet of said insertion hole.

2. A work chucking/inserting apparatus to be used for chucking a work and inserting the work into an insertion hole in alignment with the hole, including:

three or more chuck fingers,

said chuck fingers being arranged in circumferentially spaced positions and capable of advancing and retreating radially,

inner surfaces of said chuck fingers serving as chuck surfaces for chucking said work, and

outer surfaces of said chuck fingers having at least at tip end portions thereof surfaces parallel to an inner peripheral surface of said insertion hole, and capable of being brought into contact with an inlet of said insertion hole.

3. A work chucking/inserting apparatus to be used for chucking a work and inserting the work into an insertion hole in alignment with the hole, including:

three or more chuck fingers and three or more hole position detecting fingers,

said chuck fingers being arranged in circumferentially spaced positions and capable of advancing and retreating radially,

said hole position detecting fingers being arranged in circumferentially spaced positions and pivotable inwards and outwards, centered on base end portions thereof,

inner surfaces of said chuck fingers serving as chuck surfaces for chucking said work, and

outer surfaces of said hole position detecting fingers being tapered at least at tip end portions thereof so that the closer to the tips, the more inwards the taper, and capable of coming into contact with an inlet of said insertion hole.

4. A work chucking/inserting apparatus according to claim 3, wherein the base end portions of said hole position detecting fingers are pivotally connected to tip end portions of said chuck fingers.

5. A work chucking/inserting apparatus according to claim 3, wherein the base end portions of said hole position detecting fingers are pivotally connected to a base portion by which base portions of said chuck fingers are supported for radial advance and retreat.

6. A work chucking/inserting apparatus according to any of claims 1 to 5, further including a tracer mechanism which, when the outer surfaces of said chuck fingers or of said hole position detecting fingers come into contact with the inlet of said insertion hole, causes the axis of a conical surface defined by the outer surfaces of said three or more chuck fingers or of said three or more hole position detecting fingers to be aligned with the axis of said insertion hole.

7. A work chucking/inserting apparatus according to any of claims 1 to 6, further including a pushing mechanism for pushing said work toward said insertion hole.

8. A work chucking/inserting apparatus according to any of claims 1 to 7, wherein the inlet of said insertion hole is chamfered, and tip end portions of said chuck fingers are respectively formed with projections which can fill up the chamfered portion when said work is inserted into said insertion hole.

9. A work chucking/inserting apparatus according to any of claims 1 to 8, wherein said work is a piston or an assembly of a piston and a connecting rod, and said insertion hole is a cylinder bore.

10. A work chucking/inserting apparatus according to claim 3, wherein said work is an assembly of a piston and a connecting rod, said insertion hole is a cylinder bore, said chuck fingers chuck said piston, and said hole position detecting fingers also serve as means for chucking said connecting rod.

11. A work chucking/inserting apparatus to be used for chucking a work and inserting the work into an insertion hole in alignment with the hole, including:

three or more chuck fingers,

said chuck fingers being arranged in circumferentially spaced positions and capable of advancing and retreating radially,

inner surfaces of said chuck fingers serving as chuck surfaces for chucking said work and each having a portion tapered such that the closer to the tip thereof, the more inwards the taper,

outer surfaces of said chuck fingers being tapered at least at tip end portions thereof so that the closer to the tips, the more inwards the

taper, and capable of coming into contact with an inlet of said insertion hole,

a tracer mechanism for causing the axis of a conical surface defined by the outer surfaces of said three or more chuck fingers to be aligned with the axis of said insertion hole when said outer surfaces come into contact with the inlet of said insertion hole, and

a pushing mechanism for pushing the work toward said insertion hole.

12. A work chucking/inserting apparatus according to claim 11, wherein the inlet of said insertion hole is chamfered, and the tips of the outer surfaces of said chuck fingers are formed so that they can come into abutment against the chamfered portion when said work is inserted into said insertion hole.

13. A work chucking/inserting apparatus to be used for chucking a work and inserting the work into an insertion hole in alignment with the hole, including:

three or more chuck fingers,

said chuck fingers being arranged in circumferentially spaced positions and capable of advancing and retreating radially,

inner surfaces of said chuck fingers serving as chuck surfaces for chucking said work and each having a portion tapered such that the closer to the tip thereof, the more inwards the taper,

end faces of said chuck fingers being flat at their portions except their portions close to their inner peripheral edges, and capable of coming into abutment against a wall surface which surrounds an inlet of said insertion hole, the portions close to said inner peripheral edges being tapered such that the closer to the tips, the more inwards the taper, and capable of coming into contact with the inlet of said insertion hole,

the inlet of said insertion hole being chamfered,

the portions close to the inner peripheral edges of the end faces of said chuck fingers being capable of coming into abutment against the chamfered portion of the inlet of said insertion hole when said work is inserted into said insertion hole,

a tracer mechanism for causing the axis of a conical surface defined by the portions close to the inner peripheral edges of the end faces of said three or more chuck fingers to become aligned with the axis of said insertion hole when the portions close to said inner peripheral edges come into contact with the inlet of said insertion hole, and

a pushing mechanism for pushing said work toward said insertion hole.

14. A work chucking/inserting apparatus according to any of claims 11 to 13, wherein said work is a piston or an assembly of a piston and a connecting rod, and said insertion hole is a cylinder bore.

15. A work chucking/inserting apparatus according to any of claims 11 to 14, wherein said pushing mechanism possesses a work sucking function for sucking said work.

16. An assembling unit comprising a robot which conveys the work chucking/inserting apparatus described in any of claims 1 to 15 up to the position of said insertion hole and which controls the posture of the work chucking/inserting apparatus so that said work is inserted into said insertion hole in alignment with the hole.